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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/530,126

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Jari Helin

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EXAMINER

LAU, JONATHAN S

ART UNIT

PAPER NUMBER

4173

NOTIFICATION DATE

DELIVERY MODE

01/24/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No. 10/530,126	Applicant(s) HELIN ET AL.	
	Examiner Jonathan Lau	Art Unit 4173	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 94-116 is/are pending in the application.
- 4a) Of the above claim(s) 96, 101 and 106-116 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 94, 95, 97-100 and 102-105 is/are rejected.
- 7) ☒ Claim(s) 102 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3pg/04Apr2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This application is the national stage entry of PCT/FI03/00734, filed 06 Oct 2003; and claims benefit of foreign priority document FINLAND 20021772, filed 04 Oct 2002.

Claims 94-116 are pending in the current application. Claims 106-116, drawn to non-elected inventions, are withdrawn. Claims 96 and 101, drawn to non-elected species, are withdrawn. Claims 94, 95, 97-100 and 102-105 are examined on the merits herein.

Election/Restrictions

Applicant's election with traverse of the invention of Group I, claims 94-105, in the reply filed on 03 Dec 2007 is acknowledged.

Applicant argues Tibor Mora (US Patent 2,719,179) is inappropriate since Tibor Mora does not disclose and does not enable the present method. However, as recited in the Restriction Requirement mailed 02 Aug 2007, the common feature of the inventions of Groups I-IV is the glycoconjugate, not the specific method of making glycoconjugates. This common feature is a known product. One example of such a glycoconjugate is disclosed Tibor Mora in column 3, lines 16-19, wherein the tetrasaccharide of D-glucose indicated as a substrate is the glycoconjugate of glucose, an aldomonosaccharide according to group A in instant claim 94, and a D-glucose trisaccharide, an oligosaccharide containing a saccharide from group A according to group F of instant claim 94. A further example is D-glucose, an aldomonosaccharide according to group A in instant claim 94, the compound disclosed in the formula of

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instant claim 106 when m is 0. Furthermore, Tibor Mora discloses and is enabled for the method claimed in instant claim 94, although the method is not relied upon to demonstrate lack of unity. See column 7, lines 44-45 and 64-70, demonstrating acid catalysis in the conjugation of D-glucose and the envisioning of the method practiced with a mixture of saccharides in place of D-glucose.

Applicant argues that Shah et al. (WIPO publication WO98/41545) does not disclose the present synthesis of the exact product obtained by the method of claim 112 comprising equimolar amounts of saccharide and polyol in conjugate. However, as recited in the Restriction Requirement mailed 02 Aug 2007, the common feature of the inventions of Groups V and VI is the saccharide-polyol conjugate. This common feature is a known product. Such a saccharide-polyol conjugate, such as the conjugate of glucose, an aldomonosaccharide according to group A in instant claim 112, and glycerol, a polyol, is disclosed by Shah et al. on page 5, lines 13-17. The invention as claimed does not require equimolar amounts of saccharide and polyol in conjugate.

Applicant's arguments are not found persuasive.

The requirement is still deemed proper and is therefore made FINAL.

Applicant's election of species of the glycoconjugate of Gal and GlcNAc, the species of acid catalyst of hydrochloric acid, and the species of alcohol sorbitol, in the reply filed on 03 Dec 2007 as a starting point for the search and examination process is acknowledged.

Claim 96, drawn to non-elected species of saccharides of group A, is withdrawn.

Claim 101, drawn to the non-elected species of saccharides from group F or G, is withdrawn.

Claim Objections

Claim 102 is objected to because of the following informalities: Instant claim 102 recites, "The method according to claim 94, wherein the reaction products do not contain or contain minimum amounts of anhydro products." As written, instant claim 102 may be interpreted as, "The method according to claim 94, wherein the reaction products do not contain minimum amounts of anhydro products or contain minimum amounts of anhydro products." Appropriate correction is required.

Applicant is advised that should claim 94 be found allowable, claim 97 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim 94 recites, "A method for the preparation of glycoconjugates comprising reacting under **condensing conditions involving acid or metal catalysis** at least two non-protected saccharides selected from the group consisting of..."

Claim 97 recites, "The method according to claim 94, wherein **said condensing conditions involve acid or metal catalysis.**"

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 102 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Instant claim 102 recites, "The method according to claim 94, wherein the reaction products do not contain or contain minimum amounts of **anhydro** products".

The Applicant's attention is drawn to *In re Wands*, 8 USPQ2d 1400 (CAFC1988) at 1404 where the court set forth eight factors to consider when assessing if a disclosure would have required undue experimentation. Citing *Ex parte Forman*, 230 USPQ 546 (BdApls 1986) at 547 the court recited eight factors:

(1) The nature of the invention; (2) the state of the prior art; (3) the relative skill of those in the art; (4) the predictability or unpredictability of the art; (5) the breadth of the claims; (6) the amount of direction or guidance presented; (7) the presence or absence of working examples; and (8) the quantity of experimentation necessary.

Nature of the invention: A method for the preparation of glycoconjugates comprising reacting under condensing conditions involving acid or metal catalysis at least two non-protected saccharides.

The state of the prior art: The term “anhydro” when applied to saccharides is understood to mean the cyclized form of the saccharide. For example, anhydroglucose is synonymous with glucopyranose.

It is well known that sugars readily form the cyclic structure, and that the cyclization is catalyzed by acid or base. See Garret and Grisham, page 213, line 17-26 (Garret and Grisham, Biochemistry, 1999, Saunders College Publishing, 2nd ed, p213-214, cited in PTO-892). Therefore a method for the preparation of glycoconjugates comprising reacting under condensing conditions involving acid or metal catalysis at least two non-protected saccharides will form the cyclized, or anhydro, product.

The relative skill of those in the art: The relative skill of those in the art is high.

The predictability or unpredictability of the art: It is well known that sugars readily form the cyclic, or anhydro, structure. While the reactivity of most chemical functionalities is relatively predictable, the sheer number of mono- and oligo-saccharides and acid or metal catalyzed reaction conditions means that one skilled in the art cannot predict the formation of reaction products do not contain or contain minimum amounts of **anhydro** products for all possible method for the preparation of glycoconjugates comprising reacting under condensing conditions involving acid or metal catalysis at least two non-protected saccharides. Therefore the claimed invention is unpredictable.

The Breadth of the claims: The scope of the claims is infinite. Any possible combination of mono- and oligo-saccharides could potentially be used as the starting materials and any number of acid or metal catalyzed reaction conditions may be used.

The amount of direction or guidance presented: The specification speaks generally about monosaccharide anhydride products and glucose derivative side products. However, guidance is not given for what these products are.

The presence or absence of working examples: The only working examples provided are for the formation of cyclized, or anhydro, sugars. For example see Figure 14, schemes 4-7, in instant drawing 14.

Note that lack of working examples is a critical factor to be considered, especially in a case involving sugars that are well known to readily form the cyclic, or anhydro, structure. See MPEP 2164.

The quantity of experimentation necessary: In order to practice the invention skilled in the art would undertake a novel and extensive research program regarding organic synthesis. Because this research would have to be exhaustive, and because it would involve such a wide and unpredictable scope of chemical compounds, it would constitute an undue and unpredictable experimental burden.

Genentech, 108 F.3d at 1366, states that, "a patent is not a hunting license. It is not a reward for search, but compensation for its successful conclusion." And "patent protection is granted in return for an enabling disclosure of an invention, not for vague intimations of general ideas that may or may not be workable."

Therefore, in view of the Wands factors, as discussed above, particularly the breadth of the claims, Applicants fail to provide information sufficient to practice the claimed invention for all possible reactions wherein the reaction products do not contain or contain minimum amounts of **anhydro** products.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 102 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "minimum" in claim 102 is a relative term which renders the claim indefinite. The term "minimum" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Written description is not disclosed as to what minimum amounts of anhydro products are.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 94, 95, 97, 98, 100, 103, 104 and 105 are rejected under 35 U.S.C. 102(b) as being anticipated by Hindsgaul et al. (WIPO publication WO 96/06102, published 29 Feb 1996, provided by Applicant in IDS filed 04 Apr 2005).

Hindsgaul et al. discloses a mixture of oligosaccharides derived from at least two sugar monomers wherein the sugar monomer of the core structure is unprotected and the substituent sugar is an unprotected sugar and is linked to the core structure through an O-glycosidic bond formed through free hydroxyl groups (page 2, lines 8-18).

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Illustrative examples of sugar monomers disclosed by Hindsgaul et al. are galactose (page 3, line 29) and the C₁ alkyl ester of N-acylglucosamine, which is inherently N-acetylglucosamine, (page 4, lines 8-9). Hindsgaul et al. discloses the preparation of said mixture of oligosaccharides, or condensing of the oligosaccharides, occurs with a promoter, or catalyst, (page 8, lines 17-21) said promoter being the mineral acid HCl (page 10, line 9). The preparation of an a mixture of oligosaccharides by the condensing of galactose and N-acetylglucosamine involving HCl catalysis through an O-glycosidic bond formed through free hydroxyl groups anticipates instant claims 94, 95, 97, 103, 104 and 105. The mixture of oligosaccharides is inherently an oligosaccharide library as claimed in instant claim 103, as evidenced by Hindsgaul et al. in the use of the mixture of oligosaccharides as a screening library for biological activity (page 12, lines 1-6). The reaction disclosed by Hindsgaul et al. is carried out in the temperature range from -40 °C to 100 °C, anticipating instant claim 98. Hindsgaul et al. discloses the oligosaccharide consists of 2 to 8 sugar monomers (page 2, lines 19-20) and is chromatographically isolated (page 12, lines 5-6), anticipating instant claim 100.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 94 and 99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hindsgaul et al. (WIPO publication WO 96/06102, published 29 Feb 1996, provided by Applicant in IDS filed 04 Apr 2005) in view of Rennhard (US Patent 3,766,165, issued 16 Oct 1973, cited in PTO-892).

Hindsgaul et al. discloses a mixture of oligosaccharides derived from at least two sugar monomers wherein the sugar monomer of the core structure is unprotected and the substituent sugar is an unprotected sugar and is linked to the core structure through an O-glycosidic bond formed through free hydroxyl groups (page 2, lines 8-18). Illustrative examples of sugar monomers disclosed by Hindsgaul et al. are galactose (page 3, line 29) and the C₁ alkyl ester of N-acylglucosamine, which is inherently N-acetylglucosamine, (page 4, lines 8-9). Hindsgaul et al. discloses the preparation of said mixture of oligosaccharides, or condensing of the oligosaccharides, occurs with a promoter, or catalyst, (page 8, lines 17-21) said promoter being the mineral acid HCl

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(page 10, line 9). Therefore Hindsgaul et al. discloses the preparation of a mixture of oligosaccharides by the condensing of galactose and N-acetylglucosamine involving HCl catalysis through an O-glycosidic bond formed through free hydroxyl groups. Hindsgaul et al. discloses the sugar monomers include those carrying a polyol substituent (page 4, line 18).

Hindsgaul et al. does not disclose the reaction wherein reaction further comprises the specific polyol sorbitol as a separate reagent.

Rennhard teaches the inclusion of a polyol such as sorbitol in the acid catalyzed condensation of saccharides to yield a superior product (Rennhard, column 6, lines 1-3). Rennhard teaches the polyol is chemically incorporated into the condensation product (Rennhard, column 6, lines 4-6).

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the process disclosed by Hindsgaul et al. with inclusion of the polyol sorbitol as taught by Rennhard to improve a similar process in the same way. The work of Hindsgaul et al. and Rennhard is in the same field of acid catalyzed condensation of saccharides. Rennhard teaches the polyol is chemically incorporated into the condensation product, whereas Hindsgaul et al. discloses the sugar monomers include those already carrying a polyol substituent, indicating one of ordinary skill in the art at the time of the invention would have a reasonable expectation of success when improve the process disclosed by Hindsgaul et al. by inclusion of the polyol sorbitol as taught by Rennhard. One of ordinary skill in the art at the time of the invention would have been motivated to modify the invention of Hindsgaul et al. by inclusion of the

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polyol sorbitol as taught by Rennhard because of the teaching of Rennhard that the inclusion of a polyol such as sorbitol in the acid catalyzed condensation of saccharides to yield a superior product.

Conclusion

No claim is found to be allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan S. Lau whose telephone number is (571) 270-3531. The examiner can normally be reached on Monday - Thursday, 9 am - 4 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ardin Marschel can be reached on (571) 272-0718 or Cecilia Tsang can be reached on (571) 272-0562. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JSL

/Ardin Marschel/
Supervisory Patent Examiner, Art Unit 1614